



Science Standards of Learning *Sample Scope & Sequence*

Grade 3

*Commonwealth of Virginia
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Preface

As an additional resource to help school divisions develop curricula aligned to the 2003 Standards of Learning, the Virginia Department of Education has developed sample scope and sequence documents for kindergarten through grade eight and for core high school courses. These sample documents provide guidance on how the essential knowledge, skills, and processes that are identified in the Standards of Learning and the Standards of Learning Curriculum Frameworks may be introduced to students in a logical, sequential, and meaningful manner.

These sample scope and sequence documents are intended to serve as general guides to help teachers and curriculum developers align their curricula and instruction to support the Standards of Learning. Each sample document is organized around specific topics to help teachers present information in an organized, articulated manner. Also included are correlations to the Standards of Learning for that curricular area for a particular grade level or course, as well as ideas for classroom assessments and teaching resources.

The sample scope and sequence documents are not intended to prescribe how curriculum should be developed or how instruction should be delivered. Instead, they provide examples showing how teachers and school divisions might present to students in a logical and effective manner information that has been aligned with the Standards of Learning. School divisions that need assistance in developing curricula aligned with the Standards of Learning are encouraged to consider the sample scope and sequence guides. Teachers who use the documents should correlate the content identified in the guides with available instructional resources and develop lesson plans to support instruction.

The *Science Standards of Learning Sample Scope and Sequence* and the *Science Standards of Learning Curriculum Framework* can be found in both PDF and Microsoft Word file formats on the Virginia Department of Education's Web site at <http://www.doe.virginia.gov/VDOE/Instruction/sol.html>.

Introduction

The following sample scope and sequence is based on the essential content, skills, and processes developed for each Third Grade standard in the *Science Standards of Learning Curriculum Framework*. It is not intended to be a complete or exhaustive set of all that students should master at this level, but instead the scope and sequence organizes a core of key skills, content, and processes around basic topic areas.

The topic areas generally correspond to individual standards; however, certain standards are reorganized and grouped with components of other standards to comprise meaningful instructional clusters. The various topics are not intended to require equal instructional time. Additional objectives have not been developed, and no attempt has been made to transition or further explain the content. Additional information may be obtained from the overview and introductory sections of the Third Grade *Science Standards of Learning Curriculum Framework* (<http://www.doe.virginia.gov/VDOE/Instruction/Science/sciCF.html>).

An important and consistent thread among these organizational topics is the application of inquiry skills throughout. Students should have an opportunity to master the various science concepts in each topic area in the context of active learning and inquiry processes. The focus on inquiry is further reinforced by having the first topic in the scope and sequence as a discrete treatment of the science skills; however, a discrete treatment is certainly not required. This represents only one way to organize instruction; there are many other valid and useful organizational schemes.

Effective science teaching requires assessing and understanding what students know and need to learn and then challenging and supporting them to learn it well. The array of effective assessment techniques that teachers can employ in the classroom goes well beyond traditional assessments, and science instruction lends itself well to alternative approaches such as portfolios, student self assessments, and short videotaped presentations. The assessments mentioned in the scope and sequence are intended to be general. It is the role of the local curriculum to develop a detailed review of what is most effective for the particular concept being developed.

The resources section included in this scope and sequence provides a brief sample of instructional resources and staff development materials that are generally available without charge. There is a significant body of commercially available instructional materials that correlates well with the Science Standards of Learning and is of very high quality. This document, however, does not include references to those materials.

Organizing Topic	Related Standards
Investigating Metric Measurement	3.1 d-f, h, i
Investigation Skills	3.1 a-f
Investigating Matter	3.3, 3.1
Investigating Simple and Compound Machines	3.2, 3.1
Investigating Animal Adaptations	3.4, 3.1
Investigating Food Chains	3.5, 3.1
Investigating Different Environments	3.6, 3.1
Investigating the Survival of Organisms	3.10, 3.1
Investigating Natural Cycles	3.8, 3.1
Investigating the Water Cycle	3.9, 3.1
Investigating Soil	3.7, 3.1
Investigating Energy Resources	3.11, 3.1

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Metric Measurement	Students should be able to:		Student demonstrations	
	measure length to the nearest centimeter.	3.1e	Classroom observations	
	(measure) mass to the nearest gram.	3.1f	Student work	
	(measure) volume to the nearest milliliter and liter.	3.1d	Quizzes	
	(measure) temperature to the nearest degree Celsius.	3.1h	Tests	
	(measure) time to the nearest minute using the appropriate instrument.	3.1i		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigation Skills (A discrete introduction to specific science skills is not necessary as all of the inquiry skills should be incorporated within the following topical areas. Teachers may consider introducing some of these skills in isolation or coordinated with mathematics, English, and history instruction.)	Students should be able to:	3.1	Student demonstrations Classroom observations Student work Quizzes Tests	<i>Teaching and Learning the Basic Science Skills</i> videotape teacher training series, site guide: http://www.doe.virginia.gov/VDOE/Instruction/sol.html <i>Science SOL Curriculum Framework:</i> http://www.doe.virginia.gov/VDOE/Instruction/Science/sciCF.html <i>DOE Lessons from the Bay</i> teaching module http://www.doe.virginia.gov/VDOE/LFB/
	develop hypotheses from simple questions. These questions should be related to the concepts in the third grade standards. Hypotheses should be stated in terms such as: “If an object is cut into smaller pieces, then the physical properties of the object and its smaller pieces will remain the same.” make and communicate predictions about the outcomes of investigations. make and communicate careful observations. communicate results of investigations by displaying data in the form of tables, charts, and graphs. Students will construct bar and picture graphs and line plots to display data. (Example: 3.7—comparison of types of soil and their effect on plant growth) classify objects into at least two major sets and subsets based on similar characteristics, such as predator/prey and herbivore, carnivore, and omnivore. sequence natural events chronologically. (Example: 3.9—plant and animal life cycles, phases of the moon, the water cycle, and tidal change)			

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Matter	<p>Students should be able to:</p> <p>infer that objects are made of one or more materials based on observations of the physical properties that are common to each individual object.</p> <p>compare the physical properties of smaller pieces of a material to those physical properties of the entire material.</p> <p>conclude that materials have their own set of physical properties that are observable.</p> <p>explain that physical properties are observable characteristics that enable one to differentiate objects.</p> <p>design an investigation to determine if the physical properties of a material will remain the same if the material is reduced in size.</p>	3.3	<p>Student demonstrations</p> <p>Classroom observations</p> <p>Student work</p> <p>Quizzes</p> <p>Tests</p>	<p><i>Physical Science SOLutions</i> module: http://www.smv.org/pubs/index.html</p>
	<p>apply the 3.1 science skills in the context of the content of this topic.</p>	3.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Simple and Compound Machines	Students should be able to:	3.2	Student demonstrations Classroom observations Student work Quizzes Tests	<i>Physical Science SOLutions</i> module: http://www.smv.org/pubs/index.html
	identify and differentiate the six types of simple machines: lever, screw, pulley, wheel and axle, inclined plane, and wedge. analyze the application of and explain the function of each of the six types of simple machines. An example would be that an inclined plane is a ramp to make it easier for a heavy object to be moved up or down. differentiate and classify specific examples of simple machines found in school and household items. These include a screwdriver, nutcracker, screw, flagpole pulley, ramp, and seesaw. design and construct an apparatus that contains a simple machine. identify and classify the simple machines, which compose a compound machine, such as scissors, wheelbarrow, and bicycle.			
	apply the 3.1 science skills in the context of the content of this topic.	3.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Animal Adaptations	<p>Students should be able to:</p> <p>describe and explain the terms <i>hibernation</i>, <i>migration</i>, <i>camouflage</i>, <i>mimicry</i>, <i>instinct</i>, and <i>learned behavior</i>.</p> <p>give examples of methods that animals use to gather and store food, find shelter, defend themselves, and rear young.</p> <p>compare the physical characteristics of animals, and explain how the animals are adapted to a certain environment.</p> <p>explain how an animal's behavioral adaptations help it live in its specific habitat.</p> <p>design and construct a model of a habitat for an animal with a specific adaptation.</p> <p>distinguish between physical and behavioral adaptations of animals.</p> <p>create (model) a camouflage pattern for an animal living in a specific dry-land or water-related environment. (Relates to 3.6.)</p> <p>compare and contrast instinct and learned behavior.</p>	3.4	<p>Student demonstrations</p> <p>Classroom observations</p> <p>Student work</p> <p>Quizzes</p> <p>Tests</p>	<p>DOE <i>Lessons from the Bay</i> teaching module http://www.doe.virginia.gov/VDOE/LFB/</p> <p><i>Our Living Environment</i> teacher training module: http://www.doe.virginia.gov/VDOE/Instruction/OurLivingEnvironment.doc</p> <p><i>Project WILD</i> activity guide: http://www.dgif.state.va.us/education/wildlife_education.html</p> <p><i>Project Learning Tree</i>: http://www.plt.org/</p>
	<p>apply the 3.1 science skills in the context of the content of this topic.</p>	3.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Food Chains	<p>Students should be able to:</p> <p>distinguish among producers, consumers, herbivores, omnivores, carnivores, and decomposers.</p> <p>create and interpret a model of a food chain showing producers and consumers.</p> <p>explain how a change in one part of a food chain might affect the rest of the food chain.</p> <p>identify sequences of feeding relationships in a food chain.</p> <p>differentiate between predators and prey.</p> <p>infer that most food chains begin with a green plant.</p>	3.5	<p>Student demonstrations</p> <p>Classroom observations</p> <p>Student work</p> <p>Quizzes</p> <p>Tests</p>	<p><i>Our Living Environment</i> teacher training module: http://www.doe.virginia.gov/VDOE/Instruction/OurLivingEnvironment.doc</p> <p><i>Project WILD</i> activity guide: http://www.dgif.state.va.us/education/wildlife_education.html</p> <p><i>Project Wild Aquatic</i> activity guide: http://www.projectwild.org/materials/materials.htm</p> <p><i>Project Learning Tree</i>: http://www.plt.org/</p>
	<p>apply the 3.1 science skills in the context of the content of this topic.</p>	3.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Different Environments	Students should be able to:	3.6	Student demonstrations Classroom observations Student work Quizzes Tests	<p>DOE <i>Lessons from the Bay</i> teaching module http://www.doe.virginia.gov/VDOE/LFB/</p> <p><i>Our Living Environment</i> teacher training module: http://www.doe.virginia.gov/VDOE/Instruction/OurLivingEnvironment.doc</p> <p><i>Project WILD</i> activity guide: http://www.dgif.state.va.us/education/wildlife_education.html</p> <p><i>Project Wild Aquatic</i> activity guide: http://www.projectwild.org/materials/materials.htm</p> <p><i>Project Learning Tree, K-8:</i> http://www.plt.org/</p>
	describe major water-related environments and examples of animals and plants that live in each. describe major dry-land environments and examples of animals and plants that live in each. compare and contrast water-related and dry-land environments. distinguish between a population and a community. explain how animals and plants use resources in their environment. analyze models or diagrams of different water-related environments in order to describe the community of organisms each contains and interpret how the organisms use the resources in that environment. analyze models or diagrams of different dry-land environments in order to describe the community of organisms each contains and interpret how the organisms use the resources in that environment. predict what would occur if a population in a specific environment were to die.			

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Different Environments (continued)	apply the 3.1 science skills in the context of the content of this topic.	3.1		<i>Project WET activity guide:</i> http://www.deq.state.va.us/education/wetinfo.html

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating the Survival of Organisms	Students should be able to:	3.10	Student demonstrations Classroom observations Student work Quizzes Tests	<p>DOE <i>Lessons from the Bay</i> teaching module http://www.doe.virginia.gov/VDOE/LFB/</p> <p><i>Our Living Environment</i> teacher training module: http://www.doe.virginia.gov/VDOE/Instruction/OurLivingEnvironment.doc</p> <p><i>Project WILD</i> activity guide: http://www.dgif.state.va.us/education/wildlife_education.html</p> <p><i>Project Wild Aquatic</i> activity guide: http://www.projectwild.org/materials/materials.htm</p> <p><i>Project Learning Tree, K-8</i> : http://www.plt.org/</p>
	<p>explain how living things in an area are dependent on each other.</p> <p>compare and contrast human influences on the quality of air, water, and habitats.</p> <p>analyze the effects of fire, flood, disease, and erosion on organisms and habitat.</p> <p>describe how conservation practices can affect the survival of a species.</p> <p>describe a conservation practice in the local community.</p>			
	apply the 3.1 science skills in the context of the content of this topic.	3.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating the Survival of Organisms (continued)				<p><i>Project WET activity guide:</i> http://www.deq.state.va.us/education/wetinfo.html</p> <p><i>VA Natural Resources Education Guide</i> http://www.vanaturallly.com/eduguide.htm</p>

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Natural Cycles	<p>Students should be able to:</p> <p>explain how some events in nature occur in a pattern or cycle, such as the seasons, day and night, phases of the moon, tides, and life cycles.</p> <p>recognize that the relationships that exist between and among the Earth, sun, and moon result in day and night, seasonal changes, phases of the moon, and the tides.</p> <p>model and describe how the Earth's rotation causes day and night.</p> <p>model and describe how the sun's rays strike the Earth to cause seasons.</p> <p>observe, chart, and illustrate phases of the moon, and describe the changing pattern of the moon as it revolves around the Earth.</p> <p>analyze data from simple tide tables to determine a pattern of high and low tides.</p> <p>explain the pattern of growth and change that organisms, such as the butterfly and frog, undergo during their life cycle.</p>	3.8	<p>Student demonstrations</p> <p>Classroom observations</p> <p>Student work</p> <p>Quizzes</p> <p>Tests</p>	<p>DOE <i>Lessons from the Bay</i> teaching module http://www.doe.virginia.gov/VDOE/LFB/</p> <p><i>The Earth in Space Teacher Training:</i> http://www.smv.org/pubs/index.html</p>
	<p>apply the 3.1 science skills in the context of the content of this topic.</p>	3.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating the Water Cycle	<p>Students should be able to:</p> <p>identify the sun as the origin of energy that drives the water cycle.</p> <p>describe the processes of evaporation, condensation, and precipitation as they relate to the water cycle.</p> <p>construct and interpret a model of the water cycle.</p> <p>identify major water sources for a community, including rivers, reservoirs, and wells. Describe the major water sources for the local community.</p> <p>explain methods of water conservation in the home and school.</p> <p>analyze possible sources of water pollution in their neighborhoods, at school, and in the local community. This includes runoff from over-fertilized lawns and fields, oil from parking lots, eroding soil, and animal waste.</p> <p>appraise the importance of water to people and to other living things.</p> <p>realize living things get water from the environment in different ways.</p>	3.9	<p>Student demonstrations</p> <p>Classroom observations</p> <p>Student work</p> <p>Quizzes</p> <p>Tests</p>	<p>DOE <i>Lessons from the Bay</i> teaching module http://www.doe.virginia.gov/VDOE/LFB/</p> <p><i>Project WET</i> activity guide: http://www.deq.state.va.us/education/wetinfo.html</p> <p><i>VA Natural Resources Education Guide:</i> http://www.vanaturally.com/eduguide.htm</p>
	apply the 3.1 science skills in the context of the content of this topic.	3.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Soil	<p>Students should be able to:</p> <p>observe and recognize that soil, as a natural resource, provides the support and nutrients necessary for plant growth.</p> <p>explain how soil forms over time.</p> <p>analyze and describe the different components of soil including rock fragments, clay, silt, sand, and humus.</p> <p>comprehend the key terminology related to soil including humus, nutrients, topsoil, and bedrock.</p> <p>interpret and illustrate a basic diagram showing major soil layers including bedrock, subsoil, and topsoil.</p> <p>design an investigation to compare how different types of soil affect plant growth. This includes organizing data in tables and constructing simple graphs.</p> <p>collect, chart, and analyze data on soil conservation on the school grounds.</p> <p>evaluate the importance of soil to people.</p> <p>describe how soil can be conserved.</p>	3.7	<p>Student demonstrations</p> <p>Classroom observations</p> <p>Student work</p> <p>Quizzes</p> <p>Tests</p>	<p>DOE <i>Lessons from the Bay</i> teaching module http://www.doe.virginia.gov/VDOE/LFB/</p> <p><i>Project Learning Tree, K-8</i> http://www.plt.org/</p> <p><i>VA Natural Resources Education Guide:</i> http://www.vanaturallly.com/eduguide.htm</p>
	apply the 3.1 science skills in the context of the content of this topic.	3.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Energy Resources	Students should be able to: explain that the sun is the major source of energy for the Earth. analyze the advantages and disadvantages of using different naturally occurring energy sources. identify sources of energy and their uses. describe how solar energy, wind, and moving water can be used to produce electricity. describe how fossil fuels are used as an energy source. design a basic investigation to determine the effects of sunlight on warming various objects and materials, including water. compare and contrast renewable and nonrenewable energy sources.	3.11	Student demonstrations Classroom observations Student work Quizzes Tests	<i>VA Natural Resources Education Guide:</i> http://www.vanaturally.com/eduguide.htm <i>Virginia Environmental Education Directory:</i> http://www.deq.state.va.us/eed
	apply the 3.1 science skills in the context of the content of this topic.	3.1		